

ABSTRACT

1 This invention removes the effects of variable water velocity by calculating and
2 applying corrections that map the seismic data to an ideal case of constant water velocity.
3 All of the corrections assume, from a separate analysis step, that the vertical (zero-offset)
4 timing errors induced by the water-velocity variations and that the zero-offset water
5 bottom times are available. Equivalently, the water velocities are assumed known. The
6 timing errors and water velocities are related. The zero-offset water-bottom times are also
7 assumed available. From this information, and an arbitrarily-defined “ideal” water
8 velocity, it is possible to calculate an observed (actual) water velocity relative to the
9 “ideal” case. The only additional information needed is the angle of the ray path through
10 the water layer. The angle may be calculated directly from normal moveout velocities
11 derived from conventional analysis of the seismic data, and the information above. A
12 time-dependent and offset-dependent correction may be derived for each sample of the
13 seismic data prior to normal moveout correction.